

## A review of the species in the *Apogon fasciatus* group with a description of a new species of cardinalfish from the Indo-West Pacific (Perciformes: Apogonidae)

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### Abstract

Nine nominal, Indo-West Pacific species are treated: *Apogon fasciatus* (White, 1790), *Apogon quadrifasciatus* Cuvier in Cuvier & Valenciennes, 1828, *Apogon monogramma* Günther, 1880, *Apogon septemstriatus* Günther, 1880, *Apogon evanidus* Fowler 1904, *Apogon elizabethae* (Jordan & Seale, 1905), *Apogon quinquestriatus* Regan, 1908, *Apogon kiensis* Jordan & Snyder, 1901 and *Apogon bryx* Fraser, 1998. Four species treated as valid have VII first-dorsal spines: *Apogon fasciatus* with two brownish stripes on each side of the head and body to caudal peduncle and a faint, variable stripe along a portion of the lateral-line, 16 (15) pectoral-fin rays, and 14–17 (12, 13 or 18) gill rakers, *Apogon quinquestriatus* with four brownish stripes on each side of head and body, two reaching the caudal peduncle, 15 pectoral-fin rays, and 15 gill rakers, *Apogon septemstriatus* with three brownish stripes on each side of head and body, three reaching the caudal peduncle, 14 (13) pectoral-fin rays, and 14–16 gill rakers, *Apogon pleuron*, new species, with two brownish stripes on each side of head and body reaching the caudal peduncle, ventral edge of midlateral stripe with vertical bars, 15 (14 or 16) pectoral-fin rays, and 17–20 (15, 16 or 21) gill rakers. Two species treated as valid have VI first-dorsal spines: *Apogon bryx* with three brownish stripes on each side of head and body, two reaching the caudal peduncle, 14–15 pectoral-fin rays, and 22–23 (21 or 24) gill rakers, *Apogon kiensis*, with two brownish stripes on each side of head and body reaching the caudal peduncle, 14–15 pectoral-fin rays, and 16–18 (15 or 19–20) gill rakers. The long recognized name, *Apogon quadrifasciatus*, is synonymous with *Apogon fasciatus*.

**Key words:** Apogonidae, cardinalfish, *Apogon*, *Apogon pleuron*, *Apogon bryx*, *Apogon fasciatus*, *Apogon kiensis*, *Apogon quinquestriatus*, *Apogon septemstriatus*, new species

### Introduction

Color patterns similarities in the large genus *Apogon* are used to group various species into smaller phenetic groups which may prove to be monophyletic through additional character analysis. General habitat fidelity may provide another clue to relationships. The *Apogon*

*fasciatus* species grouping as proposed here, has a common basis in general color pattern, a mid-lateral dark stripe from the snout to tip of the caudal fin, no dark stripes below the mid-lateral stripe, no dark spots on head or body and black stomachs. First-dorsal spines are VI and VII in this group. These species generally have a coastal shelf (continental-like) distribution, preferring sandy or muddy bottoms of deeper tropical waters or shallow warm-temperate waters. The presence of an unidentified species, often identified as *Apogon fasciatus* or *A. quadrifasciatus*, resulted in a preliminary examination of the group by the author and Ernest A. Lachner in 1974. A review of that information during the past several years confirmed the initial conclusion about the existence of an undescribed species. The purpose of this report is to describe the new species, review the status of nominal species and provide a detailed examination of the gill raker variation among the valid species and geographically within *Apogon fasciatus*.

White (1790) briefly described the first species, *Mullus fasciatus*, in this complex from southeastern Australia, but either failed to preserve the specimen or it was lost with time. The original illustration clearly showed two dark stripes along the body. Lachner (1953: 439, Pl 35A), in a footnote of a key to the species of *Apogon*, created a neotype from the type locality, Port Jackson, Australia because no types were available. The neotype was not described in Lachner's text, but the footnote refers to the previous description and figure of the same specimen by Radcliffe (1911) along with a copy of the figure from White (1790). Radcliffe (1911) did not report any gill raker counts which was partially rectified by Lachner (1953: tab. 39 & 40). Randall and Lachner (1986) recounted this history without discussing *Apogon quadrifasciatus*. Randall and Hoese (1988) noted that the specimen used by Lachner can be identified with *Apogon quadrifasciatus*, a wide-ranging Indo-West Pacific species, and provided a table comparison of gill-raker counts for four species. The comparative material was not listed. Kuiter (1993) and Kuiter and Kozawa (1999) suggested that *Apogon fasciatus* is restricted to eastern Australia and that *Apogon quadrifasciatus* is more widespread in the Indian Ocean, but not reaching past Bali, Indonesia. Gon and Randall (2003) agreed with Kuiter (1993) reversing Randall and Hoese's previous conclusion about a different species in eastern Australia, based on postocular stripe characteristics.

Quoy and Gaimard (1825) described *Apogon fasciatus* from Guam, a preoccupied name as a secondary homonym, the result of White's earlier name. Weber and de Beaufort (1929) listed Quoy and Gaimard's name under *Apogon novemfasciatus* Cuvier in Cuvier and Valenictus, 1828. According to Randall and Lachner (1986) Quoy and Gaimard's holotype is *Apogon novemfasciatus*. My examination of these types leads to the same conclusion.

Cuvier in Cuvier & Valenciennes (1828) described *Apogon quadrifasciatus* from a single specimen taken at Pondichery, India. Comparing his specimen with the description of *Apogon fasciatus* (White), Cuvier concluded that differences existed. Weber and de Beaufort (1929:300) listed *Mullus fasciatus* as a questionable name with priority.

Günther (1880) briefly described two species, *Apogon monogramma* and *Apogon septemstriatus* from the Arafura Sea and provided figures (Pl. XVI, figs A & B). No comparisons were made with previously described species. Weber and de Beaufort (1929:300) listed *Apogon monogramma* as a synonym of *Apogon quadrifasciatus*.

Fowler (1904) described *Apogon evanidus* from Padang, Sumatra, Indonesia based on two specimens. He compared this species with *Apogon fraenatus*, a species in another subgenus. Weber and de Beaufort (1929:300) listed *Apogon evanidus* as a questionable synonym of *Apogon quadrifasciatus*.

Jordan & Snyder (1901) described *Apogon kiensis* from Wakanoura Kii, Japan. No species comparisons were made. Weber and de Beaufort (1929:302) contrasted the number of first dorsal spines in this species and *Apogon quadrifasciatus*.

Jordan & Seale (1905) described *Amia elizabethae* from Hong Kong, China. No species comparisons were made. Jordan and Richardson (1909) noted that *A. elizabethae* was very close to *A. quadrifasciata*. Fowler (1937) synonomized *Amia elizabethae* with *Amia quadrifasciata*.

Regan (1908) described *Apogon quinquestriatus* from South Nilandu, Maldives Islands. He related this species to *Apogon quadrifasciatus* and *A. septemstriatus*. No other material has been reported.

McCulloch (1915) created new name combinations in *Amia* based on White's name treating one new subspecies and three other color forms as polychromic subspecies: *Amia fasciata fasciata*, *A. f. aroubiensis*, *A. f. compressa*, *A. f. novemfasciata*, and *A. f. stevensi*. None of the subspecies combinations has survived as useful taxa. McCulloch listed *Apogon monogramma* and *Apogon kiensis* as synonyms of *Amia quadrifasciata*.

Fowler and Bean (1930) listed *Apogon monogramma*, *Amia elizabethae* and *Apogon quinquestriatus* as synonyms of *Amia quadrifasciata*. The species they treated as *Amia fasciata* was a combination of other dark-striped species. *Apogon kiensis* was treated as a separate species described with VII first-dorsal spines instead of VI and was misidentified.

J.L.B. Smith (1961) was the first to report on specimens, identified as *Apogon kiensis* (=*Apogon bryx*), from various locations in the Indian Ocean (Red Sea and Mozambique). All other prior reports he mentioned, Jordan & Snyder (1901), Seale (1914) and Fowler & Bean (1930), were from Japan, China and the Philippines. Some of these reports were based on a VII spined species, identified as *Apogon quadrifasciatus* or *A. fasciatus*, either due to trawl damaged first spine or overlooking the tiny first dorsal spine. Data presented here from examination of the type material of *Apogon kiensis* from Japan and material reported by Smith (1961) revealed gill raker count and slight pectoral-fin ray differences of a then undescribed species.

Fraser (1998) described *Apogon bryx* from Balayan Bay, Luzon Island Philippines from one specimen taken in 145–155 m. He compared this species with other VI spined species and concluded that *A. bryx* was related to a possible new species from the western Indian Ocean and to *A. kiensis*. Data presented here shows that *Apogon kiensis* is restricted

to the East China Sea and Japan, while *Apogon bryx* is widespread from the Red Sea (see Gon and Randall, 2003) to Taiwan and the Philippines.

## Methods

Methods of taking and recording meristic data and measurements are as follows:

Standard length. Symphysis of upper jaw to base of hypural plate.

Body depth. Origin of first dorsal spine to insertion of pelvic spine.

Head length. Front of symphysis of upper jaw to posterior-most membrane of opercle flap.

Upper jaw length. Front of symphysis of upper jaw to mid-posterior edge of maxilla.

Snout length. Front of symphysis of upper jaw to anterior edge of orbit.

Eye length. Horizontal orbit distance to edge of bony borders.

Pectoral fin length. From the dorsal anterior base to tip of longest ray.

Pelvic fin length. From the origin of pelvic fin spine to tip of longest ray.

Caudal peduncle depth. Least depth in vertical plane.

Caudal peduncle length. Horizontal distance from end of the base of the anal fin to lower hypural base.

Spine length. Base of spine to its tip.

Interorbital width. Least distance between the dorsal bony edges of the eyes.

Dorsal and anal fin-rays. All elements with the last ray, a double element with a single support, counted as one.

Pectoral fin-rays. All elements counted with no differentiation between branched and unbranched elements.

Gillrakers. All elements counted and divided into rudiments and well-developed rakers. A single gillraker in the angle included as part of the lower arch count and separate from the upper arch gillrakers. Rudiments are small, undeveloped structures about as wide as high.

Lateral-line scales. Pored scales from posttemporal bone to base of hypural plate.

Longitudinal rows of scales above lateral line. Same method as lateral-line count starting with scale in transverse row just above first pored scale.

Transverse scale rows. Rows of scales from origin of first dorsal fin (but not median row) counting downward and backward to but not including lateral line, and rows of scales from anal fin origin counting upward and forward to but not including lateral line.

Predorsal row of scales. Median row of scales on nape from anterior-most one to origin of first dorsal spine, including last scale at spine.

Circumpeduncular scales. Rows around peduncle at narrow portion divided into those above lateral line, the two lateral line rows and those below the lateral line.

All measurements are in millimeters to the nearest 0.1mm. All proportions are based on standard length and all material is reported by standard length (SL) rounded to the nearest millimeter, except for the primary type material. All x-ray photographs are in data files

maintained by the author. Maps of collection sites include literature records discussed herein. Sources of photographs not by the author are listed in the captions. Acronyms used in the lists of materials for institutions and collections cited, follow usage given in Leviton et al., (1985) and Eschmeyer (1998) except SAIAB replaces RUSI as a result of a recent name change. Field abbreviations are as follows: A — Albatross Expeditions, AWH — A. W. Herre, D — Albatross Expedition (Dredge), BBC — B. B. Collette, FHB — F.H. Berry, GVF — George Vanderbilt Foundation, JEM — J. E. McCosker, JTW — J. T. Williams, SP — Smithsonian Philippine Expedition, LK — L. Knapp, and VGS — Victor G. Springer. J. E. Randall *in lit.* provided gill raker and pectoral fin-ray data for *Apogon fasciatus* from India reported by Randall and Hoese (1988).

**Key to species of *Apogon* with a blackish to brownish midline stripe from snout to end of caudal-fin rays and without a caudal peduncular or basicaudal spot**

- 1 Six spines in first dorsal fin; first spine not tiny 8–12 % of SL ..... 2
- Seven spines in first dorsal fin, first spine tiny usually less than 3% of SL. ..... 3
- 2 Two dark stripes on body, one from over eye to posterior base of second dorsal fin, the second a broad midlateral stripe (width of pupil) from snout to end of caudal fin; 16–18 well developed gill rakers (rarely 15, 19 or 20). Japan and East China Sea .....  
..... *Apogon kiensis* Jordan & Snyder, 1901.
- Three dark stripes on body reaching to caudal fin base, uppermost stripe commencing over eye and broad midlateral stripe (width of pupil) from snout to end of caudal fin, faint narrow stripe just above midlateral stripe; 21–24 well developed gill rakers. Red Sea, East Africa to Philippines and Australia ..... *Apogon bryx* Fraser, 1998.
- 3 No dark nape stripe extending along base of dorsal fins ..... 4
- Dark nape stripe extending along base of dorsal fins ..... 5
- 4 Middle dark stripe uniform, upper arch and roof of mouth pale; 16 (15) pectoral-fin rays; 14–17 well developed gill rakers (rarely 12, 13 or 18). Red Sea, East Africa to Japan, Philippines and Australia ..... *Apogon fasciatus* (White, 1790).
- Middle dark stripe with lower edge developing into narrow vertical bars, and roof of mouth with melanophores; 15 (14 or 16) pectoral-fin rays; 17–20 well developed gill rakers (rarely 16 or 21). India to China, Philippines and New Guinea .....  
..... *Apogon pleuron* new species.
- 5 Two dark stripes reach onto caudal peduncle; 13–14 pectoral-fin rays. Philippines to Australia ..... *Apogon septemstriatus* Günther, 1880.
- Three dark stripes reach onto caudal peduncle; 15 pectoral-fin rays. Maldives .....  
..... *Apogon quinquestriatus* Regan, 1907.

*Apogon pleuron* new species

*Holotype*: USMN 357488; 70.5 mm SL; Philippines, Visayan Sea, Tanguinqui I., 11°28'42"N 123° 45'45"E; 69 m, x-ray.

*Paratypes*: USNM 268253; 57 mm SL; Samar Sea, Carigara Bay, 11°30'N 124° 40'12"E; 1980; 50–70 m., USNM 357487; 6, 59–64 mm SL; Visayan Sea, Sicogon I., 11°27'45"N 123°23'45"E; 4 Jun 1978; 47 m. USNM 332331; 104 mm SL; Visayan Sea, Southwest of Caduruan Point, 11°37'07"N 123°54'45"E; SP-78; 6 Jun 1978; 91 m. USNM 349175; 2, 65–70 mm SL; Visayan Sea, Tanguinqui I., 11°39'22"N 123°38'16"E; 20 May 1978; 62 m. ASIZP 60404; 52 mm SL; Taiwan, between Ilan, TaHsi and TaiPei, FuLung. CAS 85962; 2, 84–85 mm SL; Thailand 12°30'N 100°00'E; GVF 1565; 11–23 Dec 1957. AMS I.16749011; 3, 43–48 mm SL; New Guinea, Madang Harbor, 5°05'S 145°10'E; 4 Oct 1969; 3–10 m. ROM 73645 81.2 mm SL; Viet Nam, Khanh Hoa, Nha Trang: RW02-12; 1 May 2002.

*Other material*: **Philippines**: LUZON I.: CAS 169824; (2, 47–52); Cavite; 1901. CAS 127403; (3, 43–58); La Union Province, San Juan; 23 Dec 1922. CAS 169822; (30, 40–70); Manila Bay; 22 Dec 1933. USNM 171465; (4, 27–48); Albatross; 22 June 1908. USNM 361119; (7, 74–87); Manila fish market; 13 May 1969. USNM 262206; (4, 57–65); Sorsogon Bay. USNM 171459; (11, 46–65); Bacon; 15 Jun 1908. USNM 175657; (1, 56). USNM 361117; (1, 63); Manila market; A19760; 20 Apr 1909. USNM 361120; (1, 65); Manila Harbor; A23683; 4 Jan 1908. USNM 171475; (1, 56); Cavite market; A5969; 1 Dec 1908. USNM 361109; (13, 43–53); Manila Harbor Albatross; 31 Dec 1907 to 1 Jan 1908. USNM 361116; (7, 74–89); Manila Fish Market; 13 May 1969. USNM 361118; (4, 40–45); Limbones Cove; D5360; 8 Feb 1909. USNM 361115; (1, 69); Cavite; Lung. JOLO IS.: CAS 84938; (2, 45–52); Jolo. USNM 126374; (3, 54–56); Jolo Is.; A3567-3569; 1903. NEGROS I.: CAS 169804; (1, 67); Negros Oriental, Dumaguete; AWH 9-VI-31; A.W. Herre; 9 Jun 1931. CAS 169822; (30, 41–70); AWH V-31-33; A.W. Herre; May 1931. VISAYAN SEA: USNM 332330; (1, 73); Tanguinqui I., 11°28'39"N 123°50'05"E; 75 m. SAMAR SEA: USNM 262205; (1, 51); Carigara Bay, 11°27' N 124°48'12"E; 60-64 m. **New Guinea**: AMS.I 16749011; (3, 43–48); Madang, Bostrem Bay 5°05'S 145°48'E; 4 Oct 1969; 3–10 m. **China**: Hong Kong: CAS 160943; (23, 46–64); off Yeung Chow I.; GVF 1692; 6 Jan 1958. CAS 160990; (6, 56–79); GVF 1698; 7 Jan 1958. CAS 160952; (188, 32–83); North of Yeung Chow I. GVF 1693; 6 Jan 1958. CAS 161144; (1, 64); GVF 1700; 6 Jan 1958. CAS 85966; (3, 71–74); Tolo channel; GVF 1792; 28 Aug 1958; 16–25 m. CAS 30552; (74, 43–80); Yuang Chau I.; GVF 1696; 6 Jan 1958. **Thailand**: CAS 17675; (58, 38–66); Gulf of Thailand, Ko-Sichang, 13°08'N 100°51'E; 5 Nov 1970; 18–24 m. CAS 86002; GVF 2203; (1, 45); 10°26'34"N 99°15'24"E; 27 May 1960; 3 m. CAS 86006; (1, 73); 12°19'15"N 100°43'40"E; GVF 2306; 13 Dec 1960; 33 m. CAS 86003; GVF 2497; (1, 85); 11°58'N 99°56'30"E; 11-15 Mar 1961; 18 m. CAS 27438; (2, 38–47); Ko-Sichang; 24 Apr 1969; 27–55 m. CAS 85999; (1, 80); Rayong; GVF 1552; 7-9 Dec 1957. CAS 214236; GVF 1485; (2, 60–66); S of Trat Bay; 29 Oct 1957; 10 m. **Indonesia**: CAS 169823; (1, 64); S of Trat Bay; 29 Oct 1957; 10 m.

**nesia**: CAS 214235; (1, 46); McCluer Gulf, 1°03'06"S 130°34'E; 16 Dec 1972; 11-19 m. **Singapore**: CAS 130417; (2, 32-74); Straits Settlement; 14 Mar 1934. **Malaysia**: CAS 127850; (2, 31-39); Borneo, Sandakan; 2 Jul 1929. CAS 130421; Off Malacca; AWH 21-III-34; A.W. Herre; 21 Mar 1934. USNM 171471; Sandakan Bay; A23125-23128, 23370; 2 May 1908. USNM 171458; (27, 44-66); Sandakan Bay; 2 Mar 1908. **India**: USNM 213300; (3, 59-68); Madras State, Mandapam Camp, fish market, 9°20'N 79°10'E; FHB 66-37; 29 Sep 1966.

**Diagnosis.** A species of *Apogon* (*Ostorhinchus*) with two brownish stripes on head and body in life, mid-lateral stripe extending to tip of caudal fin, with variable vertical bars from ventral edge beginning just past the pectoral fin, dorsal stripe from snout over eye ending about middle of second dorsal fin but not past second dorsal-fin base; roof of mouth and upper gill arches dark; 15, rarely 16 pectoral-fin rays well developed gill rakers 17-20 rarely 16 or 21; total gill rakers and rudiments 21-23, rarely 19-20; VII first-dorsal spines.

**Description.** See Figure 1 for general body shape and Table 1 for proportional percentages. Paratypic and other material counts noted when different than holotype.

Dorsal fin VII-I,9 with third spine much thicker than second or fourth, last soft ray shorter than preceding ray; anal fin II,8 with last soft ray shorter than preceding ray; pectoral fin 15-15 in holotype, usually 15-15, rarely 16 (Table 2); pelvic fin I,5; principal caudal rays 9 + 8, caudal fin forked; scale counts missing for holotype, pored lateral-line scales, 24-25, extending from posttemporal onto base of caudal fin; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 5; circumpeduncular scale rows 12 (5+2+5).

Villiform teeth in several rows on the premaxilla; several rows of villiform teeth becoming a single row on side of dentary; 1-2 rows on the palatine; one row on vomer; none on ectopterygoid, entopterygoid or basihyal. Rudiments and gill rakers on first arch (Table 3): holotype with 2 rudiments and 4 gill rakers on upper arch, 1 rudiment and 14 gill rakers on lower arch, total gill rakers and rudiments 21 well developed gill rakers 18; paratypes and other material with 3-5 rudiments and 3-4 gill rakers on upper arch; 0-2 rudiment and 13-17 gill rakers on lower arch, 21-23 total rudiments and gill rakers (rarely 19-20 or 26), well develop gill rakers 17-20 (rarely 16 or 22). Second arch of holotype with 2 rudiment-like rakers on upper arch and 13 short rakers grading to rudiments on lower arch; paratypes and other material with 2+13-15.

Vertebrae 10 + 14; 5 free hypurals, 1 pair of slender uroneurals, 3 epurals, a free parhypural; 3 supraneurals; 2 supernumerary spines on first dorsal pterygiophore; basisphenoid present; supramaxilla absent; posttemporal serrate on posterior margin, 2 serrations for holotype, 2-5 for paratypes and other material; preopercle ridge smooth, edges serrate on posterior and ventral margins; infraorbital edge smooth.

Scales ctenoid for holotype where present; ctenoid on opercle, subopercle, cheek, breast, nape, pelvic in paratypes and other material; ctenoid pored lateral-line scales from

posttemporal to base of hypural; central pore canal on lateral-line scale with 2–3 pores on dorsal side, below with 1 pore, rarely with multiple pores.

Ten pores around mouth: 3 bilateral pores above premaxilla, 1 below anterior nasal area along ventral edge of crease, 2 on ventral edge of lachrymal separated by a septum; 2 bilateral pores on dentary near symphysis, 1 mid-anterior, 1 ventral.

*Color in alcohol.* Holotype as in Figure 1. Peritoneum silvery with tiny melanophores, Stomach and intestine blackish. Roof of mouth and portion of upper arches dark.

Paratypes and other material with dark dorsal stripe from snout over eye ending about middle of second dorsal fin but not past second dorsal-fin base, midline stripe from snout through eye extending to the edge of the caudal fin, beginning behind pectoral-fin base about 5–9 vertical bars variably extending onto abdominal region from ventral edge of mid-lateral stripe; lower lips with some melanophores; dark stripe on first 1–3 pelvic rays to pale with first and second rays with melanophores; anal fin with distal tips in melanophores, stripe near base of fin extending onto last anal ray tips; stripe in second dorsal extending onto 9th ray; base of anal rays, and base of 2nd dorsal fin darker posteriorly; roof of mouth and portion of upper arches dark; Peritoneum silvery with tiny melanophores, Stomach and intestine blackish.

*Life colors.* See Figure 2 for color pattern shortly after collection. Color pattern under water unknown. Fowler and Bean (1930: 65) provided color notes, as *Amia quadrifasciatus*, for specimens now in USNM 361109. Shao and Chen's (1986: fig. 44) color photograph identified as *Apogon quadrifasciatus* is this species.



**FIGURE 1.** Holotype of *Apogon pleuron*, USMN 357488; 70.5 mm SL; Philippines, Visayan Sea, Tanguinqui Island. Photograph modified from original taken by S. Raredon, USMN.

*Distribution.* Known from the continental margin of eastern India to Taiwan and New Guinea. See Figure 3 for location of collection sites.

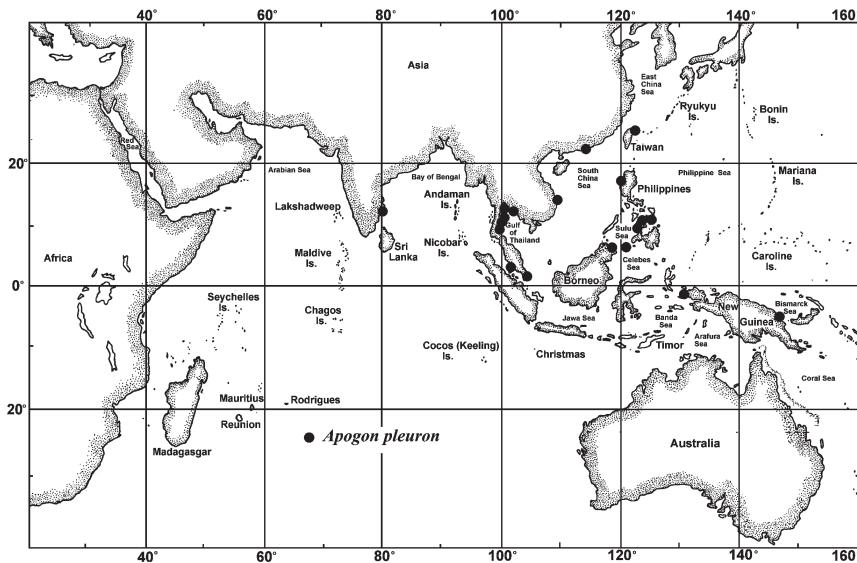
*Etymology.* The Greek noun *pleuron* meaning rib, in apposition, and referring to the dark rib-like markings extending below the mid-line stripe on the body.

*Habitat.* Found over open bottom at depths of 3–91 meters.



**FIGURE 2.** Paratype of *Apogon pleuron*, ROM 76345, Vietnam, 81.2 mm SL. Photograph modified from original taken by R. Winterbottom, ROM.

**Remarks.** This species has often been misidentified as *Apogon fasciatus*. Specimens have been collected at the same trawling stations with *Apogon fasciatus* (CAS 84758, 109712, 127401, 160957, 213347, USNM 268252, 332329). One specimen in CAS 84758 without buccal eggs, but with the mouth expansion. This species can be found in fish markets as part of trawls catches and sold for food from India to the Philippines. Largest specimen, 104 mm SL.



**FIGURE 3.** Distribution of the collection locations for *Apogon pleuron* new species.

**TABLE 1.** Proportions as a percent of standard length for the *Apogon fasciatus* species group. The proportions for the holotype of *Apogon pleuron* is followed by proportions in parentheses of the paratypes.

percent of standard length	VI-spined		VII-spined			
	<i>bryx</i>	<i>kiensis</i>	<i>pleuron</i> n. sp.	<i>fasciatus</i>	<i>septemstriatus</i>	<i>quinquestriatus</i>
greatest body depth	30	32–34	33.7 (32–38)	34–37	38–39	30–32
head length	37–38	37–41	40.0 (39–43)	35–42	40–42	39–40
eye diameter	11	11–12	11.5 (10–13)	11–13	11–12	10.4–10.8
snout length	7–9	8–9	8.9 (8–10)	8–9	9–10	9.0–9.6
bony interorbital width	7–9	7–8	7.7 (7–9)	7–8	8	6.9–7.4
upper jaw length	16–17	19–21	19.6 (18–19)	17–19	20–21	18–19
caudal-peduncle depth	13	12–14	13.0 (13–16)	13–17	17–18	14.0
caudal-peduncle length	23–24	24–27	25.2 (22–27)	24–24	20–23	21–22
1 <sup>st</sup> dorsal-fin spine length	9–12	8–11	2.5 (1–3)	1–4	4–5	1.5
2 <sup>nd</sup> dorsal-fin spine length	15–17	16–18	7.5 (7–9)	6–10	8–11	7.0–8.0
3 <sup>rd</sup> dorsal-fin spine length	14–16	15–18	18.7 (16–19)	15–18	19–20	20.0
4 <sup>th</sup> dorsal-fin spine length	12–13	14–16	17.0 (16–19)	14–17	18–20	17.0
2 <sup>nd</sup> dorsal fin spine	11–12	11–12	– (12–17)	12–15	13–14	–
1 <sup>st</sup> anal-fin spine length	2–3	2–3	3.1 (3–4)	2–3	2–3	2.0
2 <sup>nd</sup> anal-fin spine length	10	10–11	13.6 (11–14)	11–13	12–13	11.0
pectoral-fin length	22–23	21–23	26.4 (22–26)	23–28	20–22	22–25
pelvic-fin length	19–21	20–22	25.0 (22–26)	21–23	22–25	–

***Apogon fasciatus* (White, 1790)**

*Synonyms.* *Apogon quadrifasciatus* Cuvier in Cuvier & Valenciennes, 1828; *Apogon monogramma* Günther, 1880; *Apogon evanidus* Fowler, 1904; *Apogon elizabethae* (Jordan & Seale, 1905).

*Type Material Examined:* *Mullus fasciatus* Neotype, USNM 59972; 80.9 mm SL; Australia, Port Jackson; x-ray. *Amia elizabethae* Holotype, SU 9064; 65.3 mm SL; China, Hong Kong. *Apogon evanidus* Holotype, ANSP 27540; 63.9 mm SL; Indonesia, Sumatra, Padang; x-ray. Paratype, ANSP 27541; 50.0 mm SL; Indonesia, Sumatra, Padang; x-ray. *Apogon monogramma* Syntypes, BMNH 1879.5.14.177; 3, 48.9–68.6 mm SL; Arafura Sea; Challenger Expedition Sta 188–190. *Apogon quadrifasciatus* Holotype, MNHN 865; 75.2 mm SL; India, Pondicherry.

*Other Material Examined:* **Indian Ocean: Eritrea:** USNM 213294; (1, 67); Menelik, Ajuz I. 15°18'N 40°17'E; LK 71-1; 19 Sep 1971; 29–3` m. USNM 213295; (18, 38–72); Menelik, Massawa Bay, 15°40'N 39°36'E; LK 71-8; 20 Sep 1971; 79 m. USNM 213296;

(11, 51–70); Menelik, Massawa Bay, 15°40' N 39°36' E; LK 71-9; 20 Sep 1971; 79 m. USNM 213297; (5, 53–66); Menelik, Massawa Bay, 15°40'N 40°23'E; LK 71-10; 20 Sep 1971; 79 m. USNM 213298; (12, 41–63); Massawa Bay, 15°40'N 40°23'E; LK 71-11; 21 Sep 1971; 79 m. **Kenya:** SAIAB 3089; (3, 38–73); Kenya, Malindi I.; 20 Oct 1952. **Zanzibar:** USNM 213303; (1, 68); 17 Jun 1965; 2–7 m. USNM 213304; (1, 53); 4 Mar 1965 – 17 Jun 1965. **Mozambique:** SAIAB 3091; (3, 47–55); Mozambique, Nacala; 25 Oct 1950. SAIAB 3090; (1, 51); Delagoa Bay. **Seychelles:** SAIAB 3092; (1, 54); Mahe I.; Oct 1954. **Madagascar:** USNM 213311; (8, 66–79); Anton Bruun Cr. 8; Sta 408 B; 16°40'S 43°41'E; 15 Oct 1964; 60 m. USNM 357460; (4, 71–75); 16°44'S 43°44'E; Anton Bruun Sta. 407J; 15 Oct 1964; 58 m. USNM 357455; (27, 63–81); 16°11'S 43°53'E, Anton Bruun Cr. 8, Sta. 409F; 18 Oct 1964; 62 m. USNM 357453; (11, 68–70); 16°03' S 44°09'E; Anton Bruun Cr. 8, Sta. 409I; 19 Oct 1964; 25 m. USNM 357458; (5, 70–80); 15°52'S 44°23'E; Anton Bruun Sta. 409K; 19 Oct 1964; 30 m. USNM 357460; (4, 71–75); 16°44'S 43°44'E; Anton Bruun Sta. 407J; 15 Oct 1964; 58 m. USNM 357455; (27, 63–81); 16°11'S 43°53'E, Anton Bruun Cr. 8, Sta. 409F; 18 Oct 1964; 62 m. USNM 357453; (11, 68–70); 16°03' S 44°09'E; Anton Bruun Cr. 8, Sta. 409I; 19 Oct 1964; 25 m. USNM 357458; (5, 70–80); 15°52'S 44°23'E; Anton Bruun Sta. 409K; 19 Oct 1964; 30 m. SMF 26676; 1 spec; Madagascar, Nosy Bé; 13°15"S; 48°15"E. USNM uncat; (1, 40);, Nosy Bé; 18 Feb 1964. **Oman:** USNM 213308; (8, 56–73); Gulf of Oman, 26°46'N 56°47'E; Anton Bruun Cr. 4b Sta 257A; 1 Dec 1963; 46–48 m. USNM 213309; (27, 48–73); 25°52'N 56°53'E; Anton Bruun Cr. 4b Sta 261A; 1 Dec 1963; 99 m. **Iran:** SMF 26066; (8, 53–72); Persian Gulf, 28°49.61'N 49°48.506'E; 51 m. SMF 26071; (5, 46–69); Persian Gulf, 29°01.293'N 50°05.136'E; 45 m. USNM 357472; (1, 53); 26°15'N 55°46'E; Anton Bruun Cr. 4b, Sta. 260A; 1 Dec 1963; 91 m. USNM 357478; (11, 50–63); 28°58'N 56°43'E; Anton Bruun Cr. 4B; Sta 258A; 1 Dec 1963; 32 m. USNM 357478; (11, 50–63); Anton Bruun Cr. 4B; Sta 258A; 1 Dec 1963; 28°58'N 56°43'E; 33 m. USNM 357471; (2, 63–66); 26°10'N 57°05'E; Anton Bruun Cr. 4b, Sta. 256A; 30 Nov 1963; 55–64 m. ZMUC CN4; (1, 44); between Būshire and Khārk; H. Blegvad Sta 66; 25 Jan 1938. ZMUC CN5; (1, 54); Oman Gulf; H. Blegvad Sta 100; 30 Mar 1938. ZMUC CN6–7; (2, 67–67) Hormuz Strait; H. Blegvad Sta 110; 2 Apr 1938. ZMUC CN 8; near Duwwan; H. Blegvad Sta 121; 8 Apr 1938; ZMUC CN 9–10; (2, 72–74); Hendorābī I.; H. Blegvad Sta 123; 9 Apr 1938. **India:** BPBM 20495; (16, 55–80); Madras. USNM 357473; (3, 75–78); 23°00'N 68°10'E; Anton Bruun Cr. 4b, Sta. 224A; 19 Nov 1963; 24 m. USNM 357475; (2, 68–74); 22°58'N 67°32'E; Anton Bruun Cr. 4b, Sta. 226A; 19 Nov 1963; 28 m. USNM 357461; (2, 72–76); 23°16'N 67°50'E; Anton Bruun Cr. 43. Sta. 225A; 19 Nov 1963; 24–25 m. USNM 357469; (1, 73); 22°21'N 68°42'E; Anton Bruun Cr. 48, Sta. 217A; 18 Nov 1963; 26–33 m. USNM 357470; (2, 63–74); 20°23'N 70°00'E; Anton Bruun Cr. 4b, Sta. 206A; 15 Nov 1963; 66 m. CAS 29596; (8, 56–78); Maharashtra State, Bombay; 4 Nov 1973. USNM 213302; (8, 32–63); Off Bombay, 18°48'N 72°37'E ; Anton Bruun Cr. 6; 12 May 1964; 19–25 m. USNM 213307; (30, 48–76); 20°30' N 70°54' E; Anton Bruun Cr. 4B Sta 204A; 15 Nov 1963; 33 m.

USNM 304742; (20, 25–55); 3.2 km off Cochin; 2 Feb 1980; 14–38 m. FMNH 75676; (6, 50–56); W of Cochin Harbor entrance; 7 Apr 1964. USNM 213299; (3, 69–70); Madras State, Porto Novo, Vellar Estuary, 11°30' 30"N 79°50' E; FHB 66-19; 21 Sep 1966; 19 m. USNM 213301; (1, 67); Madras State, S. of Portonovo, 11°01'N 79°55'E; FHB 66-26; 23 Sep 1966. USNM 357463; (2, 70–75); Madras, 13°07'N 80°20'E; FHB 66-7; 13 Sep 1966. FMNH 75618; (4, 26–63); Mandapam; 13 Jan 1964. **Myanmar**: CAS 137208; (2, 29–44); Mergui Archipelago; 17 Jan 1937. USNM 357477; (13, 36–71); Anton Bruun Cr. 1; Sta 48; 5 Apr 1963; 19°41'N 93°8'E; 38 m. USNM 357476; (9, 40–61); Anton Bruun Cr. 1; Sta 47B; 5 Apr 1963; 20°27'N 92°20' E; 20 m. USNM 35747; (13, 36–69); 19°41'N 93°08'E; Anton Bruun Cr. 1, Sta. 48; 5 Apr 1963; 37 m. USNM 357462; (4, 60–68); 19°32'N 92°52'E; Anton Bruun Cr. 1, Sta. 49; 6 Apr 1963; 53 m. USNM 357476; (9, 42–61); 19°50'N 92°55'E; Anton Bruun Cr. 1, Sta. 47B; 5 Apr 1963. USNM 357452; (340, 26–64); 15°04'N 95°51'E; Anton Bruun Cr. 1 Sta 4; 31 Mar 1963; 44–46 m. USNM 357457; (27, 46–68); 15°04'N 95°51' E; Anton Bruun Cr. 1, Sta. 41A ; 31 Mar 1963; 29–33 m. USNM 357456; (19, 29–70); SW of Rangoon, 15°08'N 94°54'E; Anton Bruun Cr. 1, Sta. 42; 1 Apr 1963; 29 m. USNM uncat; (1, 68); SW of Rangoon, 15°08'N 94°04'E; Anton Bruun Cr. 1, Sta. 43; 1 Apr 1963. USNM uncat; (15, 38–63); 21°00'N 91°59'E; Anton Bruun Cr. 1, Sta. 46; 5 Apr 1963. USNM 357465; (1, 74); 14°07'N 97°05'E; Anton Bruun Cr. 1, Sta. 38; 30 Mar 1963; 62 m. USNM 213306; (178, 22–70); 14°52'N 96°39'E; Anton Bruun Cr. 1 Sta 39A; 31 Mar 1963. USNM 357468; (5, 45–57); 14°52'N 96°39'E; Anton Bruun Cr. 1, Sta. 39a; 31 Mar 1963; 48–64 m. **Thailand**: Adamant Sea: USNM 357474; (3, 43–60); 9°13'N 97°51'E; Anton Bruun Cr. 1, Sta. Hydro 20; 23 Mar 1963; 58–60 m. USNM 213314; (17, 48–67); 6°57'36"N 99°23'24"E; Sta 12 or 24; 10–15 Feb 1966; 28 m. **Pacific Ocean. Indonesia**: CAS 56659; (26, 20–69); Irian Jaya, North end of Gulf, 1°03'06"S 130°04'00"E; JEM 72-3; 16 Dec 1972. CAS 108362; (1, 65); Sumatra. CAS 36080; 154 spec.; Java, N of Jakarta, 5°58'S 106°48'E; 5 Dec 1975; 24 m. USNM 72655; (1, 72); Java, Batavia; 2 Apr 1909; 128 m. USNM 262162; (11, 17–44); off Pulau Adi Is., South Coast of Irian Jaya, 4°5'18"S 133°31'18"E; BBC 1742; 5 Jul 1979; 46–51 m. MCZ 36615; (1, 56); Java, Jakarta. MCZ 9733; (3, 46–56); Java, Jakarta; 1859. UF118485; (1, 74); Java; 20 Oct 1954. **Vietnam**: CAS 84764; (1, 60); off Ngoc My, 15°41'30"N 108°42'00"E; GVF 2076; 27 Feb 1960; 45 m. **Thailand**: Gulf of Thailand: CAS 84779; (9, 24–63); 11°13'50"N 99°41'30"E; GVF2718; 11 Dec 1960; 39m. CAS 84773; (14, 18–50); 13°21'45"N 100°32'43"E; GVF 2726; 14 Dec 1960; 14 m. CAS 84774; (14, 31–65); 11°57'00"N 102°44'45"E; GVF 1485; 29 Oct 1957; 10 m. CAS 84772; (5, 16–38); 12°19'15"N 100°43'40"E; GVF 2724; 13 Dec 1960; 33m. CAS 84771; (43); 11°43'00"N 101°33'7"E; GVF 2715; 11 Dec 1960; 60 m. CAS 84763; (1, 41); 12°16'45"N 100°7'15"E; GVF 2725; 13 Dec 1960; 50 m. CAS 84766; (2, 29–30); 12°21'18"N 101°31'55"E; GVF 2722; 12 Dec 1960; 26 m. CAS 84778; (3, 15–20); 11°51'15"N 99°54'45"E; GVF 2721; 12 Dec 1960; 23 m. CAS 27542; (2, 41–42); Ko-Sichang, southeast of Ko-Prong; 9 Dec 1968. MCZ 47095; (2, 58–60); Cholburi Prov., Bang Saen; 7 May 1970. CAS 86001; (2,

35–37); 13°21'45"N 100°32'43"E; GVF 2726; 14 Dec 1960; 14 m. CAS 85957; (3, 39–48); Chantaburi River mouth; GVF 1592; 24 Dec 1957. CAS 213347; (17, 19–59); Gulf of Thailand, Ko-Sichang, 13°08'N 100°51'E; 5 Nov 1970; 18–24 m. **Singapore**: MCZ uncat out of MCZ 9728; (1, 53). FMNH 45793; (32, 43–76); Johore Shoals; 12 Jun 1953. **Malaysia**: USNM 213312; (8, 38–65); off SW coast of Penang Island, 5°12'N 100°11'E; 6 May 1969. FMNH 22106; (1, 59); Sabah, Sandakan; 9 Jul 1921. SU 27850; (2, 32–38); Sabah, Sandakan; 30 Jun 1929. **South China Sea**: USNM 213313; (1, 50); Macclesfield Bank, 16°05'30"N 114°40'E – 16°05'30"N 114°43'E; Sta 19; 13 Jun 1964; 77–80 m. **Philippines**: LUZON I.: CAS 52222; (3, 51–57); 8 Jan 1950. CAS 127401; (11, 40–70); Manila Bay; 22 Dec 1933. CAS 109712; (2, 52–55); Cavite; 1901. USNM 56287; (1, 52); Cavite; Lung. CAS 120273; (3, 42–66); Manila. FMNH 47118; (4, 56–60); Manila Bay; 22 Dec 1933. USNM 171481; (1, 49); Corregidor Lt; A4405; 8 Feb 1908. USNM 122345; (6, 48–59); off Corregidor Light, 14°24'15"N 120°41'30"E; A5361; 9 Feb 1909; 3 m. USNM 213316; (16, 58–81); Manila Fish Market; 13 May 1969. USNM 171461; (37, 22–67); Manila Harbor; Albatross; 31 Dec 1907 – 1 Jan 1908. USNM 171470; (65–73); Manila market; A19761–19762; 20 Apr 1909. USNM 171469; (6, 35–47); Albatross; 22 June 1908. CAS 138153; (1, 74); Manila Bay; 7 Jul 1940. CAS 133479; (1, 72); Batangas Province, Nasugbu; 11 Dec 1936. CAS 127402; (3, 48–56); Quezon Province, Alabat I.; 20 Aug 1931. VISAYAN SEA: USNM 268252; (1, 47); NW of Tanguinqui I., 11°39'22"N 123°38'16"E; 8 Jun 1978; 62 m. USNM 357464; (2, 83–87); E of Tanguingui I.; 11°28'39"N 123°50'05"E; SP-78, Sta. T-16; 6–7 Jun 1978; 75 m. USNM 357467; (1, 57); SE Tanguingui I., 11°28'42"N 123°45'45"E; SP-78, Sta. T-4; 5 Jun 1978; 69 m. USNM 332329; (12, 46–82); E of Sicogon I., 11°27'45"N 123°23'45"E; Sp-78, Sta T-3; 4 Jun 1978; 47 m. USNM 357459; (6, 55–84); SW of Caduruan Point 11°37' 40"N 123°55'45"E; SP-78, Sta. T-8; 5 Jun 1978; 75 m. USNM 357466; (1, 56); E of S. Gigante I., 11°31'38"N 123°31'00"E; SP-78S, Sta. T-26; 8 Jun 1978; 38 m. CAS 138165; (2, 56–63); Sep 1940. USNM 171462; (9, 34–55); Limbones Cove; D5360; 8 Feb 1909. MINDANAO I: CAS 29375; (2, 19–30); Agusan Prov., Nasipit; 14 Apr 1973. CAS 29391; (1, 75); Agusan Prov., Nasipit; 14 Apr 1973. CAS 29415; (7, 24–73); Agusan Prov., Nasipit; 15-Apr-1973. USNM 171476; (1, 59); Little Vera Cruz; A6949; 28 May 1908. USNM 171479; (2, 36–49); Divata Pt.; A2245. 1 Aug 1909. USNM 171467; (2, 22–33); Nagubat I.; D5235; 9 May 1908. USNM 171460; (8, 40–71); Panabutan Point; D5131; 6 Feb 1908. CULION I.: CAS 127404; (2, 66–69); Palawan Province; Apr 1931. SAMAR SEA: USNM 357454; (17, 57–73); Carigara Bay, 11°30'00" N 124°40'12"E; Feb 1980; 50–70 m. JOLO GROUP: FMNH 5850; (2, 53–58); Jolo. MCZ 32220; (3, 50–53); Jolo; A3573–75. **Taiwan**: CAS 27749; (1, 60); North of Taiwan; 15 Oct 1972; 73–110 m. CAS 28189; (1, 61); SW of Kaohsiung in South China Sea; 13 Oct 1972. CAS 120993; (2, 65–70); Kaohsiung (Takao); 1907. CAS 121249; (1, 60); Kaohsiung (Takao); 1906. USNM 200236; (6, 61–79); Koahsiung market; 20 Apr 1962. ASIZP 60406; (1, 46); FuLung, between Iian, TaHsi and TaiPei. **China**: Hong Kong: ANSP 76663; 1 spec; Hong Kong; 1930. ANSP 76714; 1

spec; Hong Kong, Deep Water Bay; 22 May 1930. ANSP 76756; 1 spec.; Hong Kong; 1930. ANSP 77003; 1 spec; Hong Kong; 1930. ANSP 76706; 2 spec.; Tai Po; 7 Feb 1931. CAS 128005; (1, 53); Oct 1931. CAS 160957; (4, 31–40); Yuang Chau I.; GVF 1696; 6 Jan 1958. CAS 84760; (1, 38); Pearl River; GVF 1784; 14 Aug 1958; 20 m. CAS 84759; (1, 48); Pearl River; GVF 1784; 14 Aug 1958; 20 m. CAS 84757; (1, 58); Sharp I.; GVF 1719; 27 Feb 1958; 0–4.5 m. CAS 84762; (2, 37–47); Sharp I.; GVF 1723; 10 Mar 1958; 0–15 m. CAS 84758; (4, 30–64); Tolo channel; GVF 1792; 28 Aug 1958; 16–25 m. CAS 84761; (9, 30–72); Taipo Market; GVF 1788; 20 Aug 1958. CAS 84765; (3, 41–69); off Port I.; GVF 1794; 29 Aug 1958; 18 m. CAS 160889; (1, 64); Lema Islands; (Li-ma Ch'un Tao); GVF 1689; 28 Dec 1957. CAS 160909; (2, 65–67); Lema Channel; GVF 1691; 29 Dec 1957. CAS 160988; (8, 50–69); GVF 1698; 7 Jan 1958. CAS 160997; (5, 31–68); GVF 1701; 7 Jan 1958. CAS 27666; (1, 87); Guangdong Prov., off Kwang tung, sw. of Hong Kong; 7 Oct 1972; 91 m. CAS 125672; (1, 37); Guangdong Province, Hainandao, (=Hainan Island); 25 Jun 1930. MCZ 9729; (1, 46). MCZ 9731; (2, 50–79); 1861. **Australia**: NEW SOUTH WALES: CAS 107798; (5, 33–77); Sydney. CAS 120754; (1, 78); Port Jackson. SU 20754; (1, 76); Port Jackson. USNM 148623; (2, 63–66); Off Newcastle; Mar 1909. AMS I.25894005; 5(75–90); N. of Yamba, 29°15'S 153°27'E; FRV Kapala, K 85-02-09; 23 Mar 1985; 37 m. AMS I.26331003; 3(46–65); Off Clarence River, 29°20–24'S 153°26'E; FRV Kapala, K 85-15-08; 11 Oct 1985; 29–40 m. QUEENLAND: CAS 56183; 3 spec; Flinders Group. FMNH 63919; (4, 72–79); Deception Bay; 18 Apr 1950. MCZ 38598; (1, 86); Morton Bay; 24 Oct 1950. AMS I.34938001; 3(61–66); Morton Bay, 27°20'S 153°20'E; 3 Jun 1993; 7 m. AMS I. 1410; 1(90); Fraser I.; FIV Endeavour; 29 Jun 1910. AMS I. 10901; 1(90); Fraser I.; FIV Endeavour; 29 Jun 1910. AMS I.2082903; 9(38–77); Inside Decapolis Reef, 14°50'S 145°15'E; 25 Feb 1979; 8 m. AMS I.15557129; 3(52–65); Gulf of Carpentaria, 17°25'S 140°10'E; 27 Nov 1963; 10 m. AMS I.20771024; 4(37–52); Cape York, 11°37'S 142°56'E; 18 Feb 1979; 16–18 m. AMS.I 34363004; 5(46–74); Port Clinton, 22°29.22'S 150°47.43'E; 23 Oct 1993; 32–34 m. AMS.I 34938001; (3, 61–66); Moreton Bay, 27°20'S 153°20'E; 3 Jun 1993; 7 m. WESTERN AUSTRALIA: AMS I.20402037; 2(60–66); Western Australia, Camden Sound, 14°00' to 15°20'S 126°00' to 124°25'E; Apr 1978; 12–60 m. AMS I.24855014; 4(52–64); Western Australia, Dampier, 19°28'S 116°29'E; 26 Oct 1983; 110 m. **Papua New Guinea**: USNM 212199; (1, 64); Maragili, Yule I.; 8°48'S 146°30'E; Dec 02 1970; 11 m. USNM 262163; (2, 17–25); SE Cape Ward Hunt, 8°59'24"S 148°05'30"E; BBC 1695; 17 Jun 1979; 64 m. USNM 262164; (26, 17–38); off mouth of Sepik River, 3°48'00"S 144°30'30"E; BBC 1704; 20 Jun 1979; 15 m. USNM 262165; (36, 22–63); off Mouth of Sepik River, 3°46'18"S 144°30'00"E; BBC 1707; 20 Jun 1979; 18m. USNM 262714; (19, 34–76); off mouth of Fly River, 8°45'00"S 144°05'48"E; BBC 1681; 7 Jun 1979; 49 to 55 m. USNM 262207; (1, 37); Daru; 10 Oct 1975; 10 m. **Japan**: SMF 15508; (2,52-60); Shikoku-shima, kochi-ken, Oki-noshima, Moshima, 34°44'01"N 132°30'05"E.; 28 Oct 1979.

*Diagnosis.* A species of *Apogon* (*Ostorhinchus*) with two brownish stripes on head

and body in life, mid-lateral stripe extending to tip of caudal fin, dorsal stripe from snout over eye ending about middle of second dorsal fin but not past second dorsal-fin base, a variably present third shorter, faint stripe extending from dorsal part of eye to about origin of second dorsal fin; roof of mouth and upper gill arches pale; 15, usually 16 pectoral-fin rays; well developed gill rakers 15–16, total gill rakers and rudiments 18–21 (rarely 17, 22–24); VII first-dorsal spines.

*Description.* See Figure 4 for general body shape and Table 1 for proportional percentages.

Dorsal fin VII-I,9 with third spine much thicker than second or fourth, last soft ray shorter than preceding ray; anal fin II,8 with last soft ray shorter than preceding ray; pectoral fin 16–16, or 15–15 less frequently (Table 2); pelvic fin I,5; principal caudal rays 9 + 8, caudal fin forked; pored lateral-line scales, 24–25, extend from posttemporal onto base of caudal fin; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6–7; median predorsal scales 5; circumpeduncular scale rows 12 (5+2+5).

Villiform teeth in several rows on the premaxilla; several villiform rows on dentary; 1–2 rows on the palatine; 1–2 rows on vomer; none on ectopterygoid, entopterygoid or basihyal. Rudiments and gill rakers on first arch (Table 3), 2–3, rarely 1 or 4, rudiments and 3–4, rarely 2, gill rakers on upper arch, 1–3, rarely 0 or 4 rudiments and 11–13, rarely 10 or 14, gill rakers on lower arch, total gill rakers and rudiments 18–22, rarely 17 or 23–24, well developed gill rakers 14–17 rarely 12–13 or 18; second arch with 2 rudiment-like rakers on upper arch and 12–13 short rakers grading to rudiments.

Vertebrae 10 + 14; 5 free hypurals, 1 pair of slender uroneurals, 3 epurals, a free parhypural; 3 supraneurals, 2 supernumerary spines on first dorsal pterygiophore; basisphenoid present; supramaxilla absent; posttemporal with 3–4 serrations on posterior margin; preopercle ridge smooth, edges serrate on posterior and ventral margins; infraorbital edge smooth or with weak serrations on third infraorbital.

Ctenoid scales on opercle, subopercle, cheek, breast, nape, body and pelvic areas; ctenoid pored lateral-line scales from posttemporal to base of hypural; central pore canal on lateral-line scale with 2–3 pores on dorsal side, simple below with 1 pore, rarely with multiple pores.

Ten pores around mouth 3 bilateral pores above premaxilla, 1 below anterior nasal area along ventral edge of crease, 2 on ventral edge of lachrymal separated by a septum; 2 bilateral pores on dentary near symphysis, 1 mid-anterior, 1 ventral.

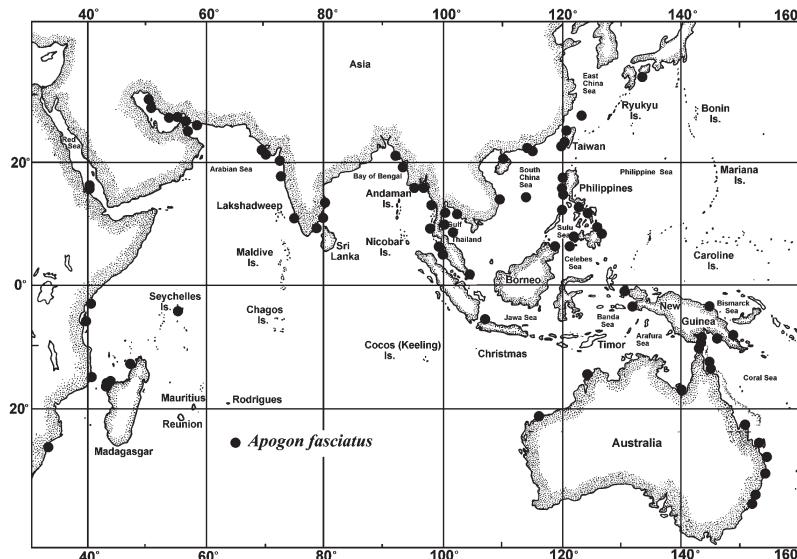
*Color in alcohol.* Dark dorsal stripe from snout over eye ending about middle of second dorsal fin but not past second dorsal-fin base, midline stripe from snout through eye extending to edge of caudal fin, variable post-ocular stripe length, either not reaching past head or reaching to level of soft dorsal fin along lateral-line scales; lower lip with some melanophores; melanophores on 1–3 pelvic rays, appearing as a stripe; anal fin with distal tips in melanophores, stripe near base of fin extending onto last anal ray tips; stripe in second dorsal near base to last ray; fin-base of anal rays, and base of second dorsal fin darker

posteriorly; roof of mouth and portion of upper branchial basket pale; peritoneum silvery with tiny melanophores, stomach and intestine blackish.

*Life colors.* Figure 4 shows the color pattern photographed shortly after collection. Kuiter and Kozawa (1999, p.12) provide underwater photographs of this species.



**FIGURE 4.** *Apogon fasciatus*, uncataloged, Philippines, Busuanga I., BUS 03-14, 50.4 mm SL. Intestine slightly prolapsed. Photograph modified from original taken by J. Williams, USNM.



**FIGURE 5.** Distribution of the collection locations for *Apogon fasciatus*.

*Distribution.* See Figure 5. This species has a coastal shelf distribution throughout the Indo-West Pacific except for the Seychelle Islands and Macclesfield Bank. Fricke (1999) lists this species, as *Apogon quadrifasciatus*, from Réunion based on old literature. This

species probably does not occur in the waters around Réunion. G. Allen provided photographs of specimens from the Solomon Islands which appear to be this species.

*Habitat.* Found over open bottom at depths of 2–128 meters.

*Remarks.* Data presented here suggests that gill raker counts are relatively stable throughout the range of this species (Table 4). Slightly higher counts are noted for the Philippines and southeastern Australia. Gill arch elements variation along the east coast of Australia show some clinal changes with latitude from the higher counts to lower counts, south to north (Table 5). The holotype of *Apogon quadrifasciatus* and the neotype of *Apogon fasciatus* are identified in the geographic distribution analysis of counts from the first gill arch (Table 3). Rudiments on the lower arch which otherwise are gill rakers on most material lead to outlier counts for Cuvier's specimen. None of the material examined suggests a different species is present in India or other regions of the Indian Ocean. The color pattern differences relating to the shorter stripe posterior to the eye was variable on the body in the preserved material examined. Smith (1961, Pl. 48G) shows the short post-ocular stripe along the pored lateral-line scales. These results agree with Randall and Hoese's opinion in 1988 that *Apogon quadrifasciatus* is a synonym of *Apogon fasciatus*. This species has been taken with *Apogon pleuron* and *A. bryx*. Buccal males were found in USNM 304742, 46–47 mm SL and USNM 357453, two with eggs in mouth 75–78 mm SL, five buccal without eggs. The largest specimen, 90 mm SL.

### *Apogon quinquestriatus* Regan, 1908

*Synonyms.* None

*Type Material Examined:* Syntypes BMNH 1901.12.31.8–9; 33.2–36.5 mm SL.

*Diagnosis.* A species of *Apogon* (*Ostorrhinchus*) with four narrow dark stripes, the first from nape along base of first and second dorsal fin, the second from above eye to upper caudal peduncle, the third from eye along lateral-line scales fading prior to caudal peduncle; the fourth midlateral from front of snout to end of caudal fin.; 15 pectoral rays; well developed gill rakers 15, total gill rakers and rudiments 19; VII first-dorsal spines.

*Description.* See Figure 6 for general body shape and Table 1 for proportional percentages.

Dorsal fin VII-I,9 with third spine much thicker than second or fourth, last soft ray shorter than preceding ray; anal fin II,8 with last soft ray shorter than preceding ray; pectoral fin 15–15 in one syntype, the other damaged (Table 2); pelvic fin I,5; principal caudal rays 9 + 8, caudal fin forked; scale counts missing for one syntype, pored lateral-line scales, 24–25, extending from posttemporal onto base of caudal fin; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 5; circumpeduncular scale rows 12 (5+2+5).

Villiform teeth in several rows on the premaxilla; several villiform rows becoming a single row on side dentary; 1–2 rows on the palatine; one row on vomer; none on ectop-

terygoid, entopterygoid or basihyal. Rudiments and gill rakers on first arch (Table 3), 2 rudiments and 3 gill rakers on upper arch, 2 rudiment and 12 gill rakers on lower arch for both syntypes, total gill rakers and rudiments 19, well developed gill rakers 15.

No internal osteology known. Supramaxilla absent. Posttemporal smooth on posterior margin. Preopercle ridge smooth, edges serrate on posterior and ventral margins. Infraorbital edge smooth.

Scales ctenoid where present, most missing on head and on parts of the body for both syntypes.

*Color in alcohol.* Four dark narrow stripes above the dark midline stripe, two stripes reach the caudal peduncle, the second and fourth down from the dorsum. No other color patterns on body.

*Life colors.* Unknown.

*Distribution.* Known only from the syntypes collected in 55–66 meters from South Nilandu, Maldives (Fig. 8).

*Habitat:* Known only from deeper water.

*Remarks:* This species has been collected once and may be restricted to the Maldives. Trawl collections examined the Indian coast line have not produced specimens. Not reported from Laccadives or Chagos Archipelago, but could be expected there.



**FIGURE 6.** The smaller syntype of *Apogon quinquestriatus*, BMNH 1901.12.31.8–9, Maldives, 33.2 mm SL.

**TABLE 2.** Pectoral fin-ray counts and averages for the *Apogon fasciatus* group.

Species	Right Pectoral-fin rays				Left Pectoral-fin rays				$\bar{X}$
	14	15	16	$\bar{X}$	13	14	15	16	
<i>fasciatus</i>		15	56	15.8			9	57	15.9
<i>pleuron</i>		30	4	15.1			29	3	15.1
<i>septemstriatus</i>	7			14	1	6			13.9
<i>quinquestriatus</i>		1					1		
<i>bryx</i>	18	15		14.5		17	15		14.5
<i>kiensis</i>	12	15	1	14.6		9	16		14.6

**TABLE 3.** Counts and averages of gill rakers and rudiments on the first gill arch for the *Apogon fasciatus* group. \* Neotype of *Mullus fasciatus*. † Holotype of *Apogon quadrifasciatus*.

Species	N	Upper and Lower Arches										Upper Arch						Lower Arch									
		17	18	19	20	21	22	23	24	25	26	$\bar{X}$	4	5	6	7	8	x	12	13	14	15	16	17	18	19	$\bar{X}$
<i>fasciatus</i> Indian	94	14	33†	43	4							19.4	1	33†	59	1	5.6		27	63†	4						13.7
Pacific	127	2	37	37	32	11*	5	2	1			19.3	1	60	56	8*	2	5.6	1	54	55*	14	3				13.7
Total	221	2	51	70	75	15	7	2	1			19.4	2	93	115	9	2	5.6	1	81	118	14	3				13.7
<i>pleuron</i>	63		2	2	16	30	12					1	21.8		2	44	16	1	6.3		4	27	24	6	1		15.6
<i>septemstriatus</i>	10	1	1	4	3	1						19.2		7	3			5.3	1	2	4	3				13.9	
<i>quinquestriatus</i>	2		2									19		2				5		2						14	
<i>bryx</i>	36					6	17	11	2	24.3			19	17			6.5			10	24	2	18.8				
<i>kiensis</i>	44		7	10	21	6	1					20.6		15	28	1		5.7		10	28	6					14.9

Species	N	Upper Rudiments					Lower Rudiments					Gill Rakers on Upper and Lower Arches														
		1	2	3	4	x	0	1	2	3	4	$\bar{X}$	12	13	14	15	16	17	18	19	20	21	22	23	24	$\bar{X}$
<i>fasciatus</i> Indian	78	2	35	41†	2.5		4	22	47	4	1†	1.7	1†		10	43	21	3								15.2
Pacific	127	4	67	52*	4	2.4	2	49	64*	12		1.7		5	21	66	19*	10	6							15.2
Total	205	6	102	93	4	2.5	6	71	111	12	1	1.7	1	5	31	109	40	13	6							15.2
<i>pleuron</i>	63	1	78	63	8	2.4	5	45	13			1.1			3	8	26	19	6	1						18.3
<i>septemstriatus</i>	10		8	2		2.2	1	2	4	3		1.6		1	7	2									15.1	
<i>quinquestriatus</i>	2		2			2		2				2			2											15
<i>bryx</i>	36	17	19			1.5	28	8				0.2								5	12	15	4	22.5		
<i>kiensis</i>	44	7	18	19		2.3	8	18	13	1		1.3		1	11	18	11	2	1							17.1

Species	N	Upper Rakers						Lower Rakers														
		2	3	4	5	6	$\bar{X}$	10	11	12	13	14	15	16	17	18	19	$\bar{X}$				
<i>fasciatus</i> Indian	78	1†	68	9			3.1	1†	10	49	18								12.1			
Pacific	127	1	104	22*			3.2	3	22	73*	21	7							12			
Total	205	2	172	31			3.1	4	32	122	39	7							12.1			
<i>pleuron</i>	63		10	51	2		3.9				5	31	21	5	1				14.5			
<i>septemstriatus</i>	7		9	1			3.1		1	8	1								12.0			
<i>quinquestriatus</i>	2		2				3			2									12			
<i>bryx</i>	36			5	28	3	4.9										17	18	1	17.6		
<i>kiensis</i>	44		26	18			3.4		2	14	24	3	1						13.7			

**TABLE 4.** Geographic variation of the number and average of rudiments and gill rakers on the first gill arch of *Apogon fasciatus*. \* Neotype of *Mullus fasciatus*. † Holotype of *Apogon quadrifasciatus*.

Locality	Total Rudiments and Rakers										Rakers									
	17	18	19	20	21	22	23	24	N	$\bar{X}$	12	13	14	15	16	17	18	N	$\bar{X}$	
Madagascar	4	4	3						11	18.9				3	8			11	15.7	
Mozambique		4							4	19.0			1	2		1		4	15.3	
Ethiopia	1	1	9						11	19.7			7	3	1		11	15.5		
Kenya		1	2						3	19.7			1	1		1		3	15.3	
Seychelles			1						1					1				1		
Iran		3	8	2					13	19.9			2	9	2			13	15.0	
India <sup>1</sup>	4	15†	13	2					34	19.4	1†		1	12	4			18	15.0	
Myanmar		4	7						11	19.6			7	4			11	15.4		
Thailand	7	3	4						14	18.8			1	11	2			14	15.2	
Vietnam	1								1			1						1		
Indonesia	7	7	6	1					21	19.0			1	5	12	1	2		21	14.9
Philippines	2	1	3	6	4				16	20.6			1	1	2	3	4	5	16	16.4
Taiwan	1	4	6	1					12	19.5			5	5	2			12	15.8	
China	4	6	2						12	18.8			1	8	3			12	15.2	
New Guinea	2	2	4						8	19.3			1	6	1			8	15.0	
Australia	20	15	7	3*	1	2	1	49	19.2		2	17	23	4*	2	1	49	15.7		
Grand Total	2	51	70	75	15	5	2	1	221	19.3	1	5	31	109	40	13	6	205	15.1	

<sup>1</sup> N differs for India because of counts which did not separate rudiments and rakers.

Locality	N	Upper Rudiments					Upper Rakers				Lower Rudiments					Lower Rakers						
		1	2	3	4	x	2	3	4	$\bar{X}$	0	1	2	3	4	$\bar{X}$	10	11	12	13	14	$\bar{X}$
Madagascar	11	1	8	2		2.1		10	1	3.1	2	6	3			1.1		4	7		12.6	
Mozambique	4	1		3		2.5		3	1	3.3	3	1				1.3		1	2	1	12	
Kenya	3		2	1		2.3		2	1	3.3	1	1	1			2		1	1	1	12	
Seychelles	1			1				1				1						1				
Ethiopia	11	3	8		2.7		10	1	3.1	1	3	7			1.5			7	4		12.4	
Iran	13	4	9		2.7		12	1	3.1		10	3			2.2		2	10	1		11.9	
India	18	7	11†		2.6	1†	16	1	3	1	6	10	1†	1.7	1†	1	13	3		12		
Myanmar	11	5	6		2.5		8	3	3.3		3	8			1.7			10	1		12.1	
Thailand	14	10	4		2.3		13	1	3.1		8	6			1.4		1	12	1		12	
Vietnam	1	1				1					1					1						
Indonesia	21	13	8		2.4	1	19	1	3	1	4	15	1	1	1.5		6	12	2	1	11.9	
Philippines	16	9	7		2.4		7	9	3.6		7	7	2		1.7	1	1	2	7	5	12.9	
Taiwan	12	3	3	6		2.3		8	4	3.3	6	6			1.5		7	5		12.4		
China	12	1	6	5		2.3		11	1	3.1	8	4			1.3		1	9	2		12.1	
New Guinea	8	4	4		2.5		8		3	1		7			1.8		1	6	1		12	
Australia	49	27	18*	4	2.5		38	6*			16	24*	9		1.9	2	17	26*	3	1	11.7	
Grand Total	205	6	102	93	4	2.5	2	172	31	3.2	6	71	111	16	2	1.7	5	32	122	39	7	12.1

**TABLE 5.** Geographic variation of the gill rakers and rudiments on the first arch of *Apogon fasciatus* along the east coast of Australia from north to south.

	Total Rudiments and Rakers						Total Rakers						Upper Rudiments			Upper Rakers		Upper Arch					
	18	19	20	21	22	23	24	13	14	15	16	17	18	2	3	4	3	4	5	6	7	8	Total
Cape York	2	2						3	1					3	1		4		3	1			4
Flinders	2		1					1	2					2	1		3		2	1			3
Lizard I	5	4						1	7	1				8	1		9		8	1			9
Port Clinton	4	1		1						6				4	1	1	6		4	1	1		6
Fraser I		1								1					1		1			1			1
Morton Bay		3								3					3		3			3			3
Yamba	1	1	5	1				6	2					3	4	1	7	1	2	5	1		5
Sydney		1	1	1	2	1		1	2	2	1			4	2	1	5		1	3	2		6

	Lower Rudiments			Lower Rakers				Lower Arch					
	1	2	3	10	11	12	13	14	13	14	15	16	Total
Cape York		4			3	1			3	1			4
Flinders		1	2	1	2				2	1			3
Lizard I	1	4	4	1	7	1			6	3			9
Port Clinton	5	1			6				5	1			6
Fraser I	1				1				1				1
Morton Bay	3				3				3				3
Yamba	2	6			7	1			1	7			8
Sydney	2	1	3		3	2	1		1	1	2	2	6

***Apogon septemstriatus* Günther, 1880***Synonyms.* None*Type Material:* Holotype BMNH 1890.2.26.33; 63.7 mm SL; Arafura Sea; Challenger.*Other material:* **Philippines:** USNM 357486; (59.7); Visayan Sea, 11°31'38"N 123°31'00"; R/V Sting Ray V, T-26; 8 Jun 1978; 38 m. USNM 262456; 4(60–65); Visayan Sea, Tanguingui I., 11°39'22"N 123°38'16"E; Sta T-25; 8 Jun 1978. USNM 171477 (A 3947); (39); Tinaka I.; 2 Feb 1908. USNM 171466 (D5146); (29); Sulade I.; 6 Feb 1908. **Australia:** Queensland: AMS E.2665; (68); near Bower; 1910. QM I.11078; (51); Magnetic I. Western Australia: WAM P.11139–40; (40–46);, Exmouth Gulf; Oct 1962. CAS 56645; 3(40–47); Ashmore I.; Timor Sea; 4 Jan 1973; 18–37 m. AMS I.20827004; 1(40); Queensland, Cape York, 11°33'S 142°56'E; 15 Feb 1979; 23 m. AMS I. 22801020; 2(51–52); Western Australia, N of Port Hedland, 19°32'S 118°09'E; 26 Mar 1982; 50–52 m.*Diagnosis.* A species of *Apogon* (*Ostorhinchus*) with three narrow dark stripes, the first from nape along base of first dorsal fin, the second from above eye to upper caudal peduncle, the third midlateral from front of snout to end of caudal fin; 13–14 pectoral rays;

well developed gill rakers 14–16, total gill rakers and rudiments 17–21; VII first-dorsal spines.

*Description.* See Figure 7 for general body shape and Table 1 for proportional percentages.

Dorsal fin VII-I,9 with third spine much thicker than second or fourth, last soft ray shorter than preceding ray; anal fin II,8 with last soft ray shorter than preceding ray; pectoral fin 14–14, rarely 13–14 (Table 2); pelvic fin I,5; principal caudal rays 9 + 8, caudal fin forked; pored lateral-line scales, 24, extending from posttemporal onto base of caudal fin; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 5–6; circumpeduncular scale rows 12 (5+2+5).

Villiform teeth in several rows on the premaxilla; several villiform rows becoming a single row on side dentary; 1–2 rows on the palatine; one row on vomer; none on ectopterygoid, entopterygoid or basihyal. Rudiments and gill rakers on first arch (Table 3), 2–3 rudiments and 3–4 gill rakers on upper arch, 0–3 rudiment and 11–13 gill rakers lower arch, total gill rakers and rudiments 17–21; second arch with 2 rudiment-like rakers on upper arch and 13 short rakers grading to rudiments on lower arch.

Vertebrae 10 + 14; 5 free hypurals, one pair of slender uroneurals, 3 epurals, a free parhypural; 3 supraneurals; 2 supernumerary spines on first dorsal pterygiophore; basisphenoid present; supramaxilla absent; posttemporal with 4–8 serrations on posterior margin; preopercle ridge smooth, edges serrate on posterior and ventral margins; infraorbital edge smooth.

Scales ctenoid on opercle, subopercle, cheek, breast, nape, pelvic and body; ctenoid pored lateral-line scales from posttemporal to base of hypural; central pore canal on lateral-line scale with 2–3 pores on dorsal side, simple below with 1 pore, rarely with multiple pores.

Ten pores around mouth 3 bilateral pores above premaxilla, 1 below anterior nasal area along ventral edge of crease, 2 on ventral edge of lachrymal separated by a septum; 2 bilateral pores on dentary near symphysis, 1 mid-anterior, 1 ventral.



**FIGURE 7.** Holotype of *Apogon septemstriatus*, BMNH 1890.2.26.33, Arafura Sea, Challenger Expedition, 63.7 mm SL.

*Color in alcohol.* Dark stripe on snout continuing behind eye on mid-body to tip of mid-caudal fin smaller than width of pupil, dark stripe over eye from snout reaching to the caudal fin base on upper caudal peduncle, midline nape stripe beginning above eyes extending to near origin first dorsal fin then splitting on either side of base of first dorsal fin extending to second dorsal fin, may be faint posteriorly, not on caudal peduncle; small melanophores but no pattern on head below mid-line; stripe in basal part of second dorsal fin, membranes of first dorsal fin with tiny melanophores but no pattern, stripe in base of anal fin, pelvic pale caudal fin pale except for midline striped; stomach black, intestine black, peritoneum silvery with many melanophores.

*Life colors.* Unknown in sea. Kuiter and Kozawa (1999, p.16) have a color photograph shortly after collection.

*Distribution.* West Pacific along continental margins from Australia and the Philippines (Fig 8). Expected elsewhere in Indonesia.

*Habitat:* Known from 18–52 meters.

*Remarks:* This species has not been confused with other species in this group. Its color pattern and meristics suggest a close relationship with *Apogon quinquestriatus*.

### *Apogon bryx* Fraser, 1998

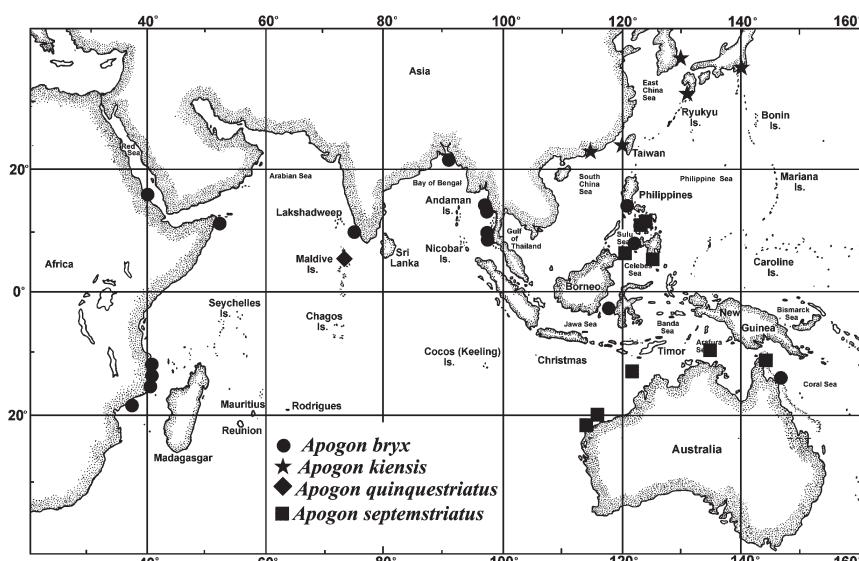
*Type Material.* Holotype CAS 34408, 42.5 mm SL; Philippines, Luzon Island, Batangas Province, Balayan Bay, south of Barrio Nonong Casto, in 146–155 m. J. E. Norton. 25 Jun 1966. x-rayed.

*Other Material:* **Indian Ocean:** Eritrea: HUJ 11765 (1, 45). **Mozambique:** SAIAB 3075 (2, 39–43); Lurio; 8 Aug 1950; x-ray. SAIAB 3074 (1, 31); Nacala; 26–27 Oct 1956; x-ray. SAIAB 3073 (2, 44–46); Mozambique I.; Jun 1950; x-ray. USNM 213372; (4, 38–45); Anton Bruun Cr. 8; LK 64-46; 9 Oct 1964; 19°09'S 36°55'E; 88 m. **Somalia:** USNM 213373; (6, 43.3–48.7); 11°18'N 51°08'E; Anton Bruun Cr. 9, Sta 459; 17 Dec 1964; 25–29 m; x-ray. **Thailand:** USNM 213366 (6, 50–60); 9°54'N 97°42'E; Anton Bruun Cr. 1, Sta 21; Mar 24 1963; 70 m; x-ray. **India:** FMNH 75675; (1, 41); west of Cochin Harbor entrance; 7 Apr 1964. **Bangladesh:** USMN 213369 (1, 51.9); USNM 213310; (1, 26); 21°00'N 91°59'E; Anton Bruun Cr. 1 Sta 46; 5 Apr 1963; 23–25 m. **Myanmar:** USNM 213367; (20, 28–60); Anton Bruun Cr. 1; Sta 22; 24 Mar 1963; 10°37'N 97°34'E; 96 m. USNM 213368; (4, 36–59); Anton Bruun Cr. 1; Sta 37; 30 Mar 1963; 13°28'N 97°19'E; 72 m. USNM 213369; (1, 51.9); Anton Bruun Cr. 1; Sta 38; 30 Mar 1963; 14°07'N 97°05'E; 62 m. USNM 213370; (6, 25–41); Anton Bruun Cr. 1; Sta 47B; 5 Apr 1963; 20°27'N 92°20'E; 20 m. USNM 213371; (1, 49); Anton Bruun Cr. 1; Sta 48; 5 Apr 1963 19°41'N 93°08'E; 38 m. **Pacific Ocean:** **Australia:** AMS I. 20753032; (3, 38–47); Queensland, NW of Nymph I., 14°36'S 145°E; 8 Feb 1979; 14–15 m; x-ray. **Indonesia:** USNM 171464; (26, 19–40); Makassas Strait; D5644); 16 Dec 1909. **Philippines:** USNM 361108; (36, 19–37); Panabutan Point; D5131; 6 Feb 1908.

*Diagnosis.* A species of the subgenus *Ostorrhinchus* with VI spines in first dorsal fin; three dark stripes on upper half of head and body, the broadest and midlateral, reaching end of caudal fin, two narrow stripes, the upper stripe reaching to base of second dorsal fin, the lower stripe reaching caudal fin base; no dark stripes in second dorsal or anal fins; 23–26 gill rakers and rudiments; 14 or 15 pectoral rays; blackish stomach and intestine, peritoneum silvery with many melanophores.

*Description.* See Figure 9 for general body shape and Table 1 for proportional percentages.

Dorsal fin VI–I,9; anal fin II,8; pectoral fin usually 14–14 or 15–15 (Table 2); pelvic fin I,5; principal caudal rays 9 + 8; pored lateral-line scales 24, extend from posttemporal onto base of caudal fin; transverse scale rows above lateral line 2; transverse scale rows below lateral line 6; median predorsal scales 6; circumpeduncular scale rows 12 (5+2+5).



**FIGURE 8.** Distribution of collection sites for *Apogon bryx*, *Apogon kiensis*, *Apogon quinquestriatus* and *Apogon septemstriatus*.

Villiform teeth in several rows on the premaxilla; two rows on the dentary; one row on the palatine and vomer; none on ectopterygoid, entopterygoid or basihyal. Rudiments and gill rakers on first arch (Table 3), 1–2 rudiments and 4–6 gill rakers on upper arch, 0–1 rudiments and 17–19 gill rakers on lower arch, 23–26 well developed gill rakers, 21–24 total gill rakers and rudiments.

Vertebrae 10 + 14; 5 free hypurals, 1 pair of slender uroneurals, 3 epurals, a free parhypural; 3 predorsals; 1 spine on first dorsal pterygiophore; basisphenoid present; supramaxilla absent; posttemporal serrate on posterior margin; preopercle serrate on vertical and horizontal margins; infraorbital shelf present on third bone.

Ctenoid scales on opercle, subopercle, cheek, breast, nape body and pelvic areas;

ctenoid pored lateral-line scales from posttemporal to base of hypural; central pore canal on lateral-line scale with 2–3 pores on dorsal side, simple below with 1 pore, rarely with multiple pores.

*Color in alcohol.* Median stripe from interorbit area to predorsal area (may be faint), stripe from interorbit over eye on each side of the body above the lateral line extending to caudal-fin base, a faint narrow stripe beginning behind eye extending to base of caudal fin above midlateral stripe, midlateral stripe (about width of pupil) from snout to end of caudal fin, ventral edge of midlateral stripe on body smooth. No stripes in second dorsal or anal fins. Stomach black, intestine pale with melanophores more intense and appearing black near the anal opening, peritoneum silvery with many melanophores.



**FIGURE 9.** *Apogon bryx*, USMN 213396, Bay of Bengal, Anton Bruun, 51.9 mm SL.

*Life colors.* Smith (1961) described the living colors of *Apogon kiensis* (= *Apogon bryx*) as “Alive silvery grey with dark stripes as in fig. 5. Fins faint pink.”

*Distribution.* This species reported from 14–155 m in coastal shelf waters of Red Sea, Indian Ocean, Australia and the Philippines (Fig. 8). Smith (1961) reported this species from turbid water.

*Remarks.* This species has been taken at the same station with *Apogon fasciatus* (USNM 357476 and 357477). This species differs from *Apogon kiensis*, a close relative, by having more rudiments and gill rakers (23–26 versus 19–22), and a narrow dark stripe just above the midline stripe between the dorsal stripe (not present in *A. kiensis*). Fraser (1998) compared *Apogon bryx* with western Indian Ocean material which he thought was an undescribed species noting the lack of any dark stripes and 14 pectoral rays as primary differences. The completely faded holotype of *A. bryx* and the previously undescribed species in the Indian Ocean are conspecific.

*Apogon kiensis* Jordan & Snyder, 1901

*Synonyms:* None.

*Type Material:* Holotype CAS (SU) 6514, 56.9 mm SL; Japan, Wakanoura Kii; Jordan and Snyder; 1900. Paratypes: CAS (SU) 6739; (21, 47–59) same data as holotype. USNM 49904; (6, 50–55); same data as holotype; x-ray.

*Other material:* **Japan:** USNM 71232; (13, 30–60); Shimizu; Albatross; 1906; x-ray; cleared and stained. USNM 59633; (1, 50); Urado; 1903; x-ray. USNM 59634; (2, 55); Urado; 1903; x-ray. FMNH 57112; (1, 25); Misaki. **China:** USNM 171463; (21, 29–42); Hong Kong; D5303; 8 Aug 1908.

*Diagnosis.* A species of *Apogon* (*Ostorrhinchus*) with VI spines in first dorsal fin; two dark stripes, a broad one from snout through eye to end of caudal fin, a narrow one from above eye to or past base of second dorsal fin; no dark stripes in second dorsal or anal fins; 16–18 gill rakers and rudiments (rarely 15, 19–20) (Table 2); 14–15 pectoral rays (rarely 16); blackish stomach and intestine, peritoneum silvery with many melanophores.

*Description.* See Figures 10–11 for general body shape and Table 1 for proportional percentages.

Dorsal fin VI–I,9; anal fin II,8; pectoral fin 14–14(3), 15–14(2) or 15–15(4); pelvic fin I,5; principal caudal rays 9 + 8; pored lateral-line scales 24; transverse scale rows above lateral line 2; transverse scale rows below lateral line 5–6; median predorsal scales 5–6; circumpeduncular scale rows 12 (5+2+5).

Villiiform teeth in a wide band on premaxilla and on dentary; two rows on the palatine and vomer; none on ectopterygoid, entopterygoid or basihyal. rudiments and gill rakers on first arch (Table 3), 1–3 rudiments and 3–4 gill rakers on upper arch, 0–3 rudiments and 13–14, rarely 12 or 15–16 gill rakers on lower arch, total well developed gill rakers 16–18 rarely 17 or 19–20; total rudiments and gill rakers 19–22, rarely 23.

Vertebrae 10 + 14; 5 free hypurals; 1 pair of slender uroneurals; 3 epurals; a free parhypural; 3 predorsals; 1 spine on first dorsal pterygiophore; supramaxilla absent; posttemporal serrate on posterior margin; preopercle serrate on vertical and horizontal margins; infraorbital shelf present on third bone. Ctenoid scales on opercle, subopercle, cheek, breast, nape body and pelvic areas; ctenoid pored lateral-line scales from posttemporal to base of hypural; central pore canal on lateral-line scale with 2–3 pores on dorsal side, simple below with 1 pore, rarely with multiple pores.

*Color in alcohol.* No median stripe from interorbit area to predorsal area, stripe from interorbit over eye on each side of the body above the lateral line fades out by posterior end of second dorsal fin, mid lateral stripe (about width of pupil) from snout extending to end of caudal fin, no stripes in second dorsal or anal fins, ventral edge of midlateral stripe on body smooth. Stomach black, intestine pale with melanophores more intense and appearing black near the anal opening, peritoneum silvery with many melanophores.

*Life colors.* Color photographs from Shao and Chen (1986: fig 30) and Kuiter and Kozawa (1999:15).

*Distribution.* This species is known from Korea, Japan, Hong Kong and Taiwan, principally from shallow waters and tide pools (Lindberg & Krasyukova, 1969; Mori, 1952; Snyder, 1912; Jordan & Thompson, 1914). Reports of this species from the Indian Ocean are based on specimens of *A. bryx*.

*Remarks.* All of the ANSP material reported by Fowler & Bean (1922) and Fowler (1931 & 1937) from Hong Kong as *Amia kiensis* are *Apogon fasciatus*. Specimens listed by Fowler & Bean (1930) as *Amia kiensis* from the Philippines with seven first dorsal spines, are *Apogon fasciatus* (USMN 122345). Shen & Lam (1977) and Shao & Chen (1986) identified *Apogon kiensis* from Taiwan. The VI first-dorsal spines and gill raker counts they report fit this species.



FIGURE 10. Holotype of *Apogon kiensis*, Wakanoura, Kii, Japan, CAS (SU) 6514, 56.9 mm SL.

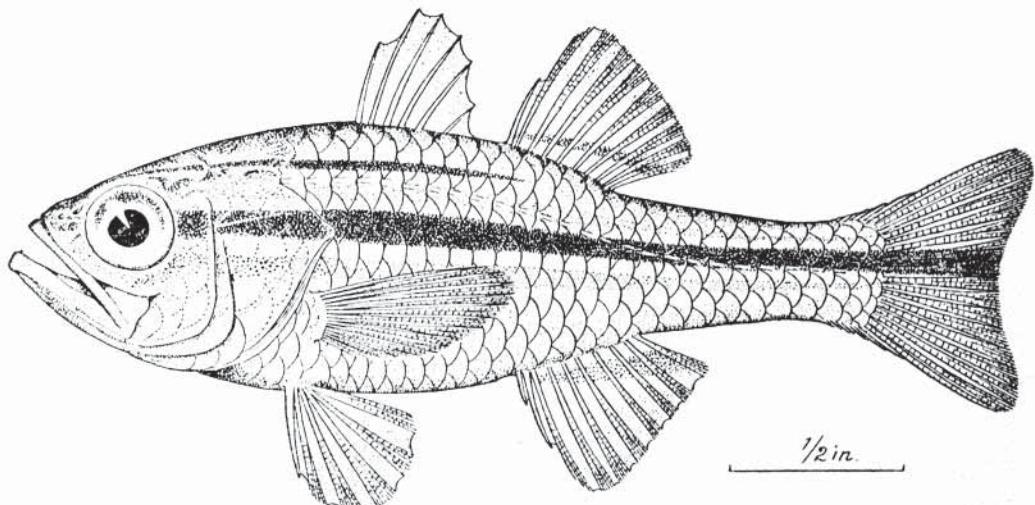


FIGURE 11. *Apogon kiensis*, modified from figure 9 in Jordan and Snyder, 1901.

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